

BIOLOGICAL EVALUATION  
Mountain Pine Beetle in Ponderosa  
and Lodgepole Pine  
Ashley National Forest  
1971

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Mountain Pine Beetle Infestation in Ponderosa and Lodgepole Pine

Manila Ranger District  
Ashley National Forest  
Region 4  
Utah

1971

INTRODUCTION

Practically all mountain pine beetle activity on the Ashley National Forest during 1971 is on the Manila Ranger District with part of the infestation within the Flaming Gorge National Recreation Area. This area, and the rest of the North Slope of the Uinta Mountain Range, has a long history of mountain pine beetle activity. A review of past records shows that control in both ponderosa and lodgepole pine was undertaken in the Manila area as early as 1931. Since then, in ensuing years, repeated attempts at control, utilizing every conceivable technique--fall and burn, fall and spray with chemicals, and standing spray with chemicals--have been used in attempts to hold tree killing in check. The last concerted control effort was during 1961 to 1964 and covered the identical area that is now infested. During that 4-year treatment period, upwards of 50,000 trees were chemically treated.

It is possible that these efforts may have reduced the level of tree mortality the years during and immediately following treatment, or perhaps 2 to 3 years longer, but the then accepted philosophy of long-term tree protection by this treatment method has since been disproven. Individual tree control is at best a delaying action and only extends tree killing beyond the time an untreated infestation would have subsided normally, but the end result is the same. Today, tree killing of varying intensities exists throughout the entire area.

This evaluation will briefly cover the 1970 situation as well as 1971. The 1970 evaluation report was prepared but not sent out because of an extended administrative review.

Tree killing of both ponderosa and lodgepole pine by the mountain pine beetle will continue for another 2 to 3 years, or until it has run its natural course. An increase in tree killing will occur in the Greendale Junction area, but elsewhere there will be a decrease. The proposed 3.5 MM Burnt Creek Timber Sale is not threatened in any way by the present infestation. Logging to salvage the dead and infested timber is encouraged, but direct control is not recommended.

## GENERAL INFORMATION

Insect - Mountain pine beetle, Dendroctonus ponderosae Hopkins.

Host Trees - Lodgepole pine, Pinus contorta Dougl. and ponderosa pine, Pinus ponderosa laws.

Location - Manila Ranger District and Flaming Gorge National Recreation Area, Ashley National Forest, Utah.

Type of Damage - Killing of ponderosa and lodgepole pine.

Extent of Infestation - Tree killing is occurring from Hickerson Park on the west, across the south boundary of the National Recreation Area, to Pipe Creek in the east. The heaviest concentrations are in the Half Moon Park area and surrounding Greendale Junction. A map showing the general outbreak areas is appended.

## BIOLOGICAL INFORMATION

1970 - On-the-ground evaluations were made in the infested areas during October 21-23 by Entomologist William Klein and Forestry Aid Wallace Murdock. They were accompanied by Forester Darrell Johnson on October 21 and 23 and by Forestry Technician Gene Campbell on October 22. An analysis of the results of this evaluation showed the infestation boundaries to be basically unchanged from the previous year, and that as many trees would be killed in 1970 (1971 faders) as there were killed in 1969. Only one area showed a sizeable decrease in tree killing and that was near Half Moon Park. Control, other than by the orderly conversion of the stands to a less susceptible state, was not recommended. Salvage logging was recommended in the Greendale Junction area.

1971 - Evaluations were made in most of the heaviest infestation areas during September 28-30 by Entomologists Lawrence Stipe and Lynn Frandsen. They were accompanied by Darrell Johnson on September 28 and by Gene Campbell on September 29. Attack ratio surveys were conducted in seven areas. General observations on brood density and condition, stand structure, and the overall attack level, were also obtained. The results of the attack ratio survey are shown in Table 1 in the Appendix.

Because of the widely scattered nature of the infestation, both new and old attacks were relatively difficult to find. Brood stage in both ponderosa and lodgepole pine was mainly eggs and young larvae. No abnormal number of parasites or predators was noted, but they also are difficult to detect during this stage of development. In the Long Park area, almost half of the infested trees were "strip attacks," or

trees having only a portion of the bole infested. Although some of these trees will survive indefinitely, most will be reattacked and killed by emerging beetles next year or shortly thereafter.

#### DISCUSSION

In 1972, tree killing will increase in the Greendale Junction area but decrease elsewhere. In the eastern part of the infestation, in the Half Moon Park area, the infestation boundaries will continue to increase but the overall level of new attacks will diminish. Poor growing conditions, past beetle outbreaks, and logging have significantly reduced the susceptibility of most of these areas. In the Long Park area, for example, the average diameter of both new and old attacks is less than 10 inches. It is unlikely that this size tree will produce more beetles than attack it.

In the Greendale Junction area, ponderosa pine is providing the impetus for the infestation. Groups of small diameter trees, as well as large individuals, are being attacked over a relatively wide area (Figure 1). Recent logging efforts have salvaged a few trees that otherwise would have been lost but have had little, if any, control effect.

Tree killing in open grown ponderosa pine east of Cart Creek, which reached a peak level in 1968 then subsided, decreased even further this year. The status of the inaccessible outbreak in lodgepole (and some small ponderosa) under Speirs Peak is unknown. The outbreak in limber pine in the upper reaches of Lodgepole Creek has subsided because of a lack of suitable host material.

The present infestation bordering the National Recreation Area offers no threat to the proposed 3.5 MM Burnt Creek Timber Sale. This stand, containing about equal volumes of lodgepole pine and Engelmann spruce, is some 9,500 feet in elevation. Recent studies<sup>1/</sup> on the North Slope have shown that lodgepole pine stands above 9,000 feet elevation will not lose more than 25 percent of merchantable trees (9 inches d.b.h. and larger) during any one infestation. Also, at this time, this particular stand is not under attack.

Ponderosa pine will continue to die in some of the campgrounds. Two new attacks were found in Bootleg Campground this year. As recommended 2 years ago, efforts should be made now to plant these areas with hardwoods or other nonsusceptible tree species.

<sup>1/</sup> Amman, Gene D., Bruce H. Baker, and Lawrence E. Stipe - 1971. Lodgepole pine losses to mountain pine beetle related to elevation on Utah's North Slope. (In manuscript.)

In managing lodgepole and ponderosa pine under attack by the mountain pine beetle, the following alternatives have been practiced at one time or another in this Region:

1. Treat all infested trees in a green area. Methods used have been fall and burn, fall and spray with chemicals, standing spray, and standing burn. We now have rather conclusive evidence that these methods, used singly or in combination, have failed to effect permanent, long-range control. As stated before, the only advantage of this treatment technique is to delay the inevitable. If the resource is threatened and an analysis shows that the value of the resource temporarily saved more than offsets suppression costs, then this method would certainly have some merit. To be really effective, however shortlived the protection may be, every infested tree throughout the entire infestation must be treated. This will also require a sustained, long-term commitment.
2. Control by logging. This is a well used phrase in the vocabulary of most entomologists and forest managers. It requires both an explanation and a definition, however. In its present context, it means that control is affected by finding and removing every infested tree. In practice, however, this technique would no more control a going beetle outbreak than falling and burning or spraying each individual tree. Both methods are effective in killing beetles in each tree, but neither method is really effective in offsetting a population trend. The problem with individual tree control, whether it be felling and removing each infested tree or spraying them, is that they do not change the condition that triggered off the infestation in the first place; that condition being the structure and physiological condition of the stand. This, then, is the crux of logging as a control technique. In order to bring about effective, long-term bark beetle control, the vulnerable stands would have to be logged at an orderly and uniform rate throughout the prescribed rotation period so as to effect full stand conversion. In cases where the stands are undergoing severe infestations or under immediate threat of attacks, an accelerated harvest may be the only meaningful prescription.
3. Salvage logging. In some cases, this is synonymous with logging for control. Salvage logging means simply the removal and utilization of timber killed or under attack by the beetle. In most cases, ~~green~~ green timber is added to the sale to make it economically practical. Salvage of the dead and attacked trees is important because it utilizes a resource that would otherwise be lost. However, under most conditions, it affords practically no control and is basically silviculturally unsound. In effect, the beetle, not us, is dictating both harvest method and location. Under these conditions, it would be difficult to follow even the best laid management plan.

There may be a few instances where individual tree removal or salvage logging would be beneficial and actually affect some degree of control, but this would be in a very localized situation where the problem was primarily man-caused. An example would be a clearcut or right-of-way where bark beetle populations (Douglas-fir beetle, Engelmann spruce beetle, or Ips) were nurtured by an abundance of logging debris. These insects then emerge and attack nearby standing trees. This is an artificial condition, and if the infested trees are properly located and promptly treated or removed, then "control" would be achieved. This method would have some application in areas of concentrated windthrow or other storm damage. Under other conditions, however, whenever a forest, or whole stands, reach a stage of vulnerability and are maintained and perpetuated in this condition, the futility of individual tree salvage or control becomes evident.

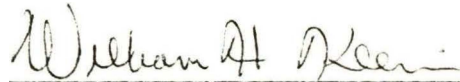
4. Individual tree protection. In high use areas such as campgrounds and visitor centers, this method has generally been effective. It entails spraying the bole of each tree with a preventive chemical prior to beetle flight. It is expensive and during outbreak years it requires annual treatment. Unfortunately, there are no preventive chemicals approved for use in reducing attacks by this beetle.
5. Do nothing. Most of the untreated mountain pine beetle infestations in the Region are or have been declining for some time. The largest remaining infestation is in a recently terminated control area on the Targhee National Forest. High tree losses will occur in this area for several years. The surrounding areas, where control was stopped several years ago or where there was no control, have subsided naturally. In these areas and in other lodgepole stands depleted by the mountain pine beetle, such as in Grand Teton National Park, Teton, Bridger, and Wasatch National Forests, and Bureau of Land Management lands, average losses range between 20-30 percent of all trees 5.0 inches d.b.h. and larger. The length of an infestation is 7 to 8 years. Peak killing occurs the fifth or sixth year. In ponderosa pine, our knowledge of impact is considerably limited. This year, in Bryce Canyon National Park, in the aftermath of a rather severe epidemic, two areas judged to contain the heaviest damage suffered losses (5.0 inches d.b.h. and larger) of 13 and 14 percent, respectively. In lodgepole pine, heaviest mortality is in the larger trees, while mortality of ponderosa pine appears to be concentrated in the intermediate size classes.

#### RECOMMENDATIONS

In view of the alternatives and with full consideration to the present situation, the following measures are recommended:

1. In those areas where intensive harvesting is practical, concentrate logging in the areas of greatest hazard; i.e., low elevation areas having a preponderance of large diameter lodgepole pine and both large and intermediate diameter ponderosa pine.
2. Salvage logging should be undertaken in the Greendale Junction area and in other areas where it is both esthetically and economically feasible.
3. Do not attempt control by artificial means<sup>s</sup>; i.e., chemical treatment or individual tree removal, for it does not effectively change the stand structure, which is the prime factor responsible for the outbreak in the first place. Long-term control of the mountain pine beetle can only be obtained by the orderly and uniform conversion of the stands to a less susceptible state.
4. Accept tree losses as inevitable in areas having high esthetic and recreation values and where intense logging is not feasible. These stands cannot be preserved in their present state.

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## APPENDIX



Figure 1. Aerial views taken during 1971 of stands surrounding Greendale Junction. In the lower photo the foreground is mostly ponderosa pine, changing to lodgepole pine at the higher elevations. Note the widely scattered distribution of the faders (1970 attacks).

TABLE 1

## Attack Ratios in Ponderosa and Lodgepole Pine

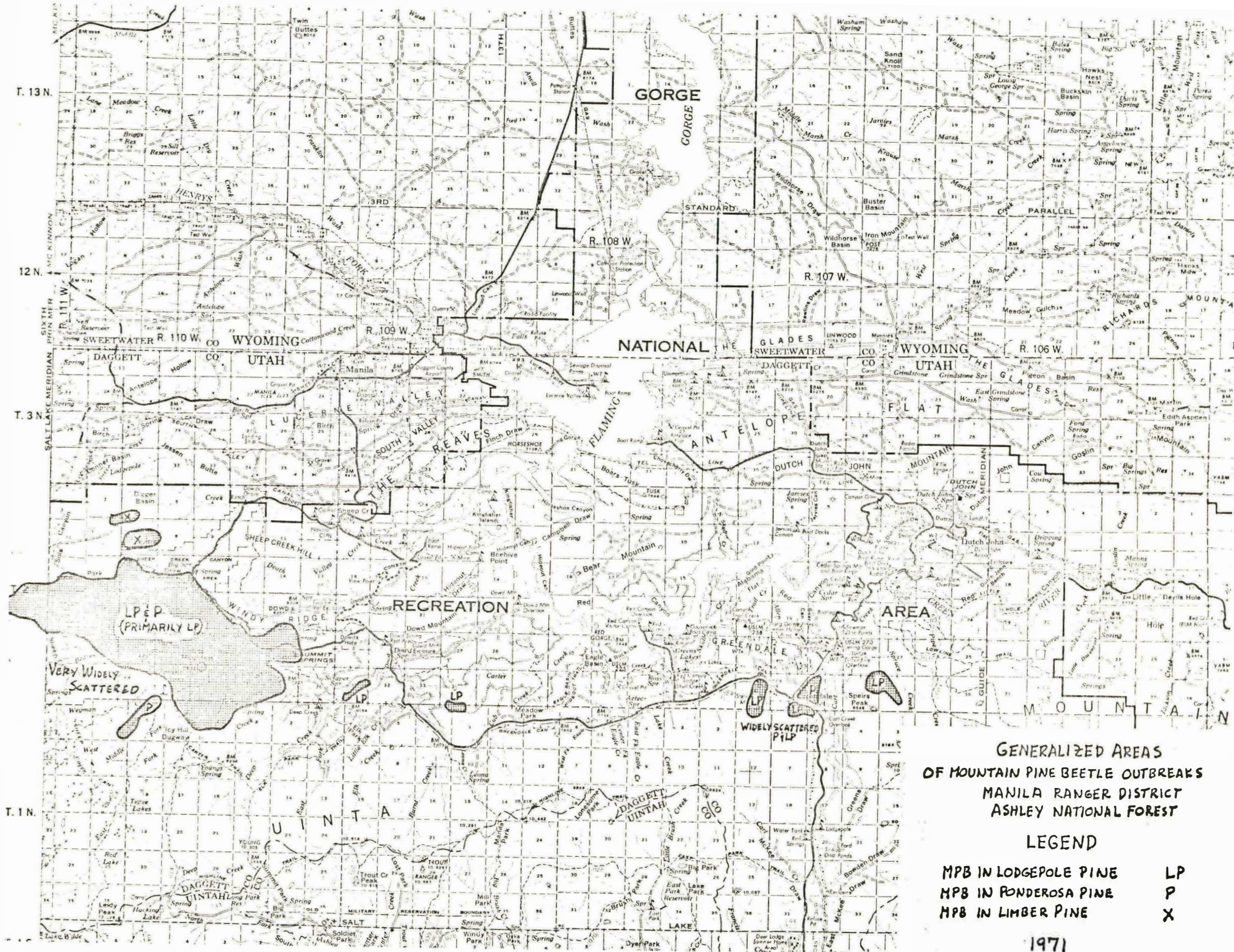
Manila Ranger District  
Ashley National Forest  
1971

| Area            | Number of Attacks |      |           |      |          |      | Attack<br>Ratio<br>71/70 | AVE. D.B.H. <sup>2/</sup> |      |      |      | Infes-<br>tation<br>Inten-<br>sity | Trend <sup>3/</sup> |
|-----------------|-------------------|------|-----------|------|----------|------|--------------------------|---------------------------|------|------|------|------------------------------------|---------------------|
|                 | Ponderosa         |      | Lodgepole |      | Combined |      |                          | 1971                      |      | 1970 |      |                                    |                     |
|                 | 1971              | 1970 | 1971      | 1970 | 1971     | 1970 |                          | PP                        | LP   | PP   | LP   |                                    |                     |
| Greendale 1     | 38                | 38   | 1         | 3    | 39       | 42   | 1:1                      | 11.8                      | 12.0 | 11.0 | 14.0 | L                                  | Static              |
| Greendale 2     | 38                | 12   | 31        | 32   | 69       | 44   | 1.6:1                    | 11.2                      | 13.0 | 12.0 | 12.8 | L                                  | Increasing          |
| Skull Cr.       | --                | --   | 21        | 14   | 21       | 14   | 1.5:1                    | --                        | 11.9 | --   | 12.4 | L                                  | Increasing          |
| Green's Lake    | 0                 | 1    | --        | --   | 0        | 1    | <u>1/</u>                | 0                         | --   | 18.0 | --   | L                                  | --                  |
| Green's Lake C. | 2                 | 6    | --        | --   | 2        | 6    | <u>1/</u>                | 8.0                       | --   | 9.7  | --   | L                                  | --                  |
| Ute L.O.        | --                | --   | 5         | 30   | 5        | 30   | 0.2:1                    | --                        | 11.2 | --   | 10.0 | L                                  | Decreasing          |
| Long Park       | --                | --   | 33        | 77   | 33       | 77   | 0.4:1                    | --                        | 9.7  | --   | 9.7  | L                                  | Decreasing          |

1/ Tree counts too few to be meaningful.

2/ Weighted average.

3/ L = Light.



**GENERALIZED AREAS  
OF MOUNTAIN PINE BEETLE OUTBREAKS  
MANILA RANGER DISTRICT  
ASHLEY NATIONAL FOREST**

**LEGEND**

MPB IN LODGEPOLE PINE LP  
MPB IN PONDEROSA PINE P  
MPB IN LIMBER PINE X

1971